

MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for March, 1905, is based on data from about 3583 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 4; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3258; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Company, 96; Hawaiian Meteorological Service, 1; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25. Total, 3583.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Lient. Commander H. M. Hodges, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San José, Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; and Señor Enrique A. Del Monte, Director of the Meteorological Service of the Republic of Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is $157^{\circ} 30'$, or $10^h 30^m$ west of Greenwich. The Costa Rican standard meridian is that of San José, $5^h 36^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by cooperative observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Barometric pressures were prevailingly low over the eastern part of the North Atlantic Ocean, and the severest storm of the month in that region visited the British coasts from the 13th to 15th. In the vicinity of the Azores pressures were high during the first decade of March, and were relatively high from the 19th to 21st and on the 31st. During the second and the greater part of the third decade, low pressures over the Azores attended the passage of storms, in several instances severe, in the higher latitudes of the ocean. Near the American coast the passage eastward of barometric depressions caused a rather regular alternation of high and low pressures.

In the United States March was a mild month, and over a great part of the interior of the country east of the Rocky Mountains the monthly average temperature was 3° to 12° above the normal. The excessive rains in Arizona and southern California, where two to three inches more than the monthly average precipitation fell, were a notable feature of the month. Farming operations were retarded in that region, and floods, largely from melting snow, caused serious washouts.

The month opened with a heavy snowstorm for the season over a small area of the Middle Atlantic States, the greatest depth, three inches, being measured at Washington, D. C. From the 4th to 10th a rainstorm advanced from the Middle

West and Southwest to the Atlantic coast. Heavy rains and high winds set in over California and Arizona on the 12th and continued in that section during the 13th. The Pacific rain area extended eastward over Texas from the 14th to the 17th, and reached the Atlantic coast on the 19th where it continued through the 21st, attended by freshets in rivers and streams of the central, southern, and eastern districts, descriptions of which are given under the heading Rivers and Floods.

The Atlantic and Gulf coasts were not visited by wind-storms of notable severity. Gales of moderate strength occurred on the north Atlantic coast on the 21st and 22d, and on the upper Lakes on the 3d, 19th, and during the night of the 25th. Unusually severe gales prevailed along the Pacific coast on the 12th, and on the north Pacific coast during the early part of the 13th, and on the 20th, 23d, and 25th.

The occurrence of damaging frost was not noted in Florida or along the Gulf coast. Frost warnings were issued for the interior of California on the 29th and 30th.

NEW ENGLAND FORECAST DISTRICT.

The only storm of consequence was that of the 21st and 22d, during which a fierce northeaster prevailed along the entire coast. Incoming steamers and sailing vessels reported high seas and head winds, while from along the shore came reports of minor disasters. Out of a fleet of sixteen fishing vessels at

Provincetown, Mass., fourteen were driven ashore on the northwest side of the harbor by the ice field under the force of the high winds. With the high spring tides and timely assistance of the revenue cutter *Algonquin* and the tug *Peter B. Bradley* the stranded vessels were floated without great damage. Ample and timely warnings of the approach of the storm were issued.—*J. W. Smith, District Forecaster.*

WEST GULF FORECAST DISTRICT.

No marked disturbance passed over this district during March. Brisk to high winds, for which warnings were issued, occurred along the Texas coast on a few dates. Frost, for which warnings were issued, occurred over the northwestern portion of the district on the 28th and 29th.—*I. M. Cline, District Forecaster.*

CENTRAL FORECAST DISTRICT.

March was remarkable for the abnormally high temperatures that prevailed during nearly the entire month, there being but two or three days when freezing temperature occurred, and about an equal number when the temperature was but slightly above normal. There were no severe storms during the month, and no cold-wave or special warnings were issued. There were only four rain periods—7th to 9th; 17th to 19th; 20th and 21st, and the 29th.—*F. J. Wals, District Forecaster.*

NORTH-CENTRAL FORECAST DISTRICT.

The temperature continued moderate with only slight interruption, and consequently no general cold-wave warning was issued. The only severe storm which passed over the district during the entire month was one which advanced from the Pacific over the middle Rockies, and reached the Lake region on the morning of the 3d. Advisory messages were sent in advance of the storm to all Lake transportation companies that maintained winter navigation. Advisory messages were also sent to open ports in advance of a few other storms of less importance. The wind movement was far below the March average, and no accidents or wrecks were reported on Lake Michigan.—*H. J. Cox, Professor and District Forecaster.*

ROCKY MOUNTAIN FORECAST DISTRICT.

There was a notable absence of cold waves, and practically no low temperatures occurred in the district during the month. Cloudy weather was a feature with an excess of precipitation in Colorado, Utah, Arizona, and New Mexico. In Arizona the precipitation exceeded the previous record for March.—*F. H. Brandenburg, District Forecaster.*

NORTH PACIFIC FORECAST DISTRICT.

The month in the North Pacific States was mild and pleasant up to and including the 11th, when a period of stormy, disagreeable weather set in and continued almost without interruption until the close of the month. From the 18th to the 25th a succession of storms moved eastward near the International Boundary Line, each of which caused gales along the Oregon and Washington coasts, and, in one or two instances, severe squally winds in the interior districts. Unusually severe were the storms of the 20th, 23d, and 25th. At the mouth of the Columbia River the wind reached a maximum velocity of 78 miles an hour from the southeast on the morning of the 20th, and on the 23d and 25th the maximum velocity at the North Head station was 72 miles from the southeast and south, respectively. At Tatoosh Island a gale of 60 miles an hour from the southwest occurred on the 25th. Storm warnings were displayed well in advance of all storms.

Sharp frosts, injurious to early fruit and tender vegetation, occurred generally throughout the district on the morning of the 30th. Frost warnings were sent to all stations on the morning of the 29th.—*A. B. Wollaber, Acting District Forecaster.*

SOUTH PACIFIC FORECAST DISTRICT.

The month was one of unusually heavy rainfall in the southern part of the State. For a number of months back attention has been called to the abnormal conditions prevailing in the southwestern portion of the United States. Unusual

rains, noticeable as far back as last August, have continued in Arizona, New Mexico, and southeastern California, and probably in the northwestern states of Mexico. The forecaster has been aware of this abnormal condition; and forecasts of rain, showers, and thunderstorms have been made on every occasion when there was an indication of a depression over the Valley of the Colorado or the northern half of Lower California. The history of the season's forecasting shows a good understanding of the abnormal condition. Emphasis is laid upon this because in southern California some attention has been given in the public press to the claims of a so-called rain maker. This individual claimed to be able to make rain, using certain small evaporating pans and chemicals. Lately his claims have changed from "rain making" to "rain coaxing", and quite recently he has attempted forecasting the weather. His claims and work are not to be taken seriously, but the notoriety achieved illustrates how much is still to be done in the matter of educating the public in meteorology.

On March 11 a depression of some depth and large area moved southward along the coast. Rain fell from San Diego to Eureka, with high southeast winds. At Point Reyes on March 12 the wind reached a maximum velocity of 90 miles; at the Farallons a maximum velocity of 75 miles was recorded. Southeast storm warnings were displayed in ample time. In all, this storm of March 12 was one of the severest of the season. The pressure at Eureka was as low as 29.18 inches.

The entire second decade of the month was stormy. The rather unusual occurrence of storm warnings flying from San Diego to Eureka was noted on more than one occasion.

On March 28 a storm of some severity appeared on the coast and several squalls of marked severity were reported in the San Francisco Bay district. On March 29 a cold-wave warning was ordered for Winnemucca. The temperature fell 36° in twenty-four hours, reaching a minimum of 4°. Frost warnings were issued for the interior of California on March 29 and 30.—*A. G. McAdie, Professor and District Forecaster.*

RIVERS AND FLOODS.

There was but one flood period during the month. It was due to the general rains and moderating temperature from the 19th to the 22d, inclusive, and the flood area extended from southern New England westward through the Hudson and Susquehanna watersheds into the Ohio River as far west as the mouth of the Big Sandy River. In the Pittsburg district the flood attained serious proportions. At Pittsburg the maximum stage reached was 29 feet, 7 feet above the danger line, on the 22d. A stage of about 31 feet had been anticipated, and its failure to materialize can doubtless be attributed to the deficient flood volume from the Monongahela, whose watershed had been practically denuded of snow.

Warnings of this flood were first issued on the 18th, and frequently thereafter until all danger had passed. Warnings were also issued for points as far down as the mouth of the Big Sandy River, and stages above the danger line were recorded as follows: Beaver Dam, Pa., 39.1 feet, 14.1 feet above; Wheeling, W. Va., 42.9 feet, 6.9 feet above; Parkersburg, W. Va., 42.4 feet, 6.4 feet above; and Point Pleasant, W. Va., 44.1 feet, 5.1 feet above. Below Point Pleasant there was a great rise, but no danger-line stages were reached, except between Mount Vernon and Evansville, Ind., where the flood volume was augmented by the rise out of the Green River.

On Saturday, the 18th, the following general statement was telegraphed from the Central Office to stations in New York and eastern Pennsylvania:

High temperatures, with coming rain, will cause general thaw to-night and Sunday. Advisable to make preparations for movement of ice with rising rivers. Colder Monday.

The events of the next few days were in keeping with the forecast. Rains, with high temperatures, prevailed, and the